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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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10/531,208

04/14/2005

Mitsuru Ueda

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EXAMINER

LEE, SIN J

ART UNIT

PAPER NUMBER

1752

MAIL DATE

DELIVERY MODE

05/16/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/531,208

Applicant(s)

UEDA ET AL.

Examiner

Sin J. Lee

Art Unit

1752

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 April 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 8/31/2006, 4/14/2005.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

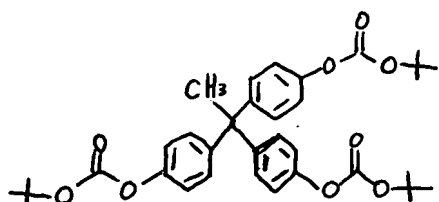
1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-7, 10, 12, 16-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Przybilla et al (Proceedings of SPIE, Vol.1672, Advances in Resist Technology and Processing IX (1992), pg.500-512).

In Table 4, Przybilla teaches the following compound



as a dissolution inhibitor used in a photoresist material for deep UV lithography (see Table 4, abstract and pg.502, right hand column). Such compound teaches present compound of formula (1) with X, Y and Z being ether bonds and B, C and D being t-butyloxycarbonyl groups. Therefore, Przybilla teaches present inventions of claims 1-7, 10, 12 and 16-18 (present claim 6 does not require that present B, C and D has to be an organic group of the formula shown in claim 5).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 9, 11, 15 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Przybilla et al (Proceedings of SPIE, Vol.1672, Advances in Resist Technology and Processing IX (1992), pg.500-512) in view of Niinomi et al (Proceedings of SPIE, Vol.2724, Advances in Resist Technology and Processing XIII (1996), pg.174-185).

Przybilla does not explicitly teach present range for the basic impurity content. It is well known in the art that basic impurities in a resist composition causes the problem of post exposure delay (PED), as evidenced by Niinomi et al, pg.174, last paragraph. Therefore, it would have been obvious to one skilled in the art to reduce any basic impurity content in Przybilla's photoresist material as low as possible in order to avoid the PED problem. Present range of 10 ppm or less for the basic impurity would have been obvious to one skilled in the art at the time the invention was made, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). Therefore, Przybilla in view of Niinomi would render obvious present inventions of claims 9, 11, 15 and 19.

5. Claims 13, 14 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Przybilla et al (Proceedings of SPIE, Vol.1672, Advances in Resist Technology and Processing IX (1992), pg.500-512) in view of Niinomi et al (Proceedings of SPIE,

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Vol.2724, Advances in Resist Technology and Processing XIII (1996), pg.174-185) and Zhong et al (7,013,965).

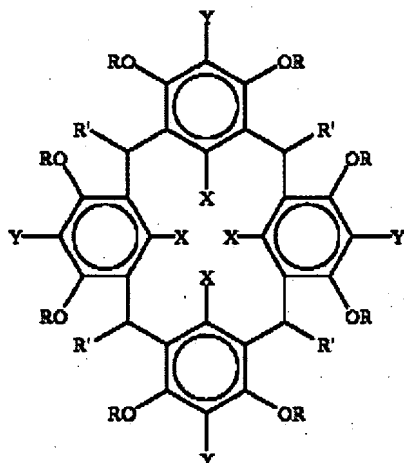
As discussed above, based on Przybilla in view of Niinomi, it would have been obvious to reduce basic impurity in Przybilla's composition in order to avoid the PED problem. It is known in the art to remove basic impurities in a composition by treating the composition with acid and with ion exchange resins as evidenced by Zhong et al, col.5, lines 9-10. Therefore, it would have been obvious to one skilled in the art to reduce any basic impurity in Przybilla's composition by using art-known methods such as treating with acid and ion exchange resins in order to avoid the PED problem. Therefore, Przybilla in view of Niinomi and Zhong would render obvious present inventions of claims 13, 14 and 20.

1-8, 10, 12 and 16-18
6. Claims^{1-8, 10, 12 and 16-18} are rejected under 35 U.S.C. 103(a) as being unpatentable over Ito et al (6,093,517).

Ito teaches the followings:

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26. The composition of claim 17, wherein the dissolution inhibitor has the structure of formula (I)



wherein:

the R moieties may be the same or different and are selected from the group consisting of hydrogen and acid-labile protecting groups, with the proviso that at least one of the R moieties is an acid-labile protecting group;

the R' moieties are independently selected from the group consisting of hydrogen, halogen, nitro, alkyl, aryl, and alkaryl, and, if alkyl, aryl or alkaryl, optionally substituted with one to four substituents selected from the group consisting of hydroxy, halogen, lower alkyl, lower alkoxy and nitro; and

the X and Y moieties may be the same or different and are selected from the group consisting of hydrogen, alkyl, alkoxy, aryl, aralkyl, alkaryl, halo, cyano, nitro and carboxylate.

27. The composition of claim 26, wherein:

the R' are independently selected from the group consisting of hydrogen, bromo, C₁-C₁₂ alkyl, and C₁-C₁₂ alkyl substituted with a hydroxyl group, a halogen atom, a phenyl ring, or a phenyl ring bearing a hydroxy, halogen or lower alkyl substituent.

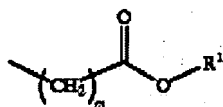
28. The composition of claim 27, wherein:

all X moieties are hydrogen, and the Y moieties are selected from the group consisting of hydrogen and lower alkyl.

29. The composition of claim 26, wherein:

all X moieties are hydrogen, and the Y moieties are selected from the group consisting of hydrogen and lower alkyl.

30. The composition of 26, wherein the acid-labile protecting groups have the structural formula



in which m is 0 or 1 and R¹ is CR²R³R⁴ wherein R², R³ and R⁴ are independently hydrogen, alkyl or aryl.

Based on Ito's teachings, it would have been obvious to one skilled in the art to have all X's and Y's of formula (I) to be H atoms, to have all R' to be methyl groups and to have all R groups to be the group of formula shown above in claim 30 in which R²-R⁴ are methyl groups (or to have 7 R groups to be such groups and to have the other R group to be a H atom) with a reasonable expectation of obtaining a resist composition with marked improvement in contrast. Therefore, Ito's teaching render obvious present inventions of claims 1-8, 10, 12 and 16-18.

7. Claims 9, 11, 15 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ito et al (6,093,517) in view of Niinomi et al (Proceedings of SPIE, Vol.2724, Advances in Resist Technology and Processing XIII (1996), pg.174-185).

Ito does not explicitly teach present range for the basic impurity content. It is well known in the art that basic impurities in a resist composition causes the problem of post exposure delay (PED), as evidenced by Niinomi et al, pg.174, last paragraph.

Therefore, it would have been obvious to one skilled in the art to reduce any basic impurity content in Ito's photoresist material as low as possible in order to avoid the

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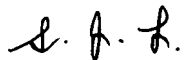
PED problem. Present range of 10 ppm or less for the basic impurity would have been obvious to one skilled in the art at the time the invention was made, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Therefore, Ito in view of Niinomi would render obvious present inventions of claims 9, 11, 15 and 19.

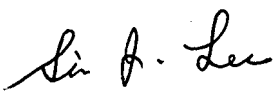
8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sin J. Lee whose telephone number is 571-272-1333. The examiner can normally be reached on Monday-Friday from 9:00 am EST to 5:30 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia Kelly, can be reached on 571-272-1526. The fax phone number for the organization where this application or proceeding is assigned is **571-273-8300**.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



S. Lee
May 12, 2007


SIN LEE
PRIMARY EXAMINER